

Towards an Inclusive Metaverse

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Our Research Focus: The Realverse

NOKIA eXtended Reality Lab | UPM Image Processing Group (GTI)



Two (or more)
distant people
which have the
sense of being
together in the
same physical
location

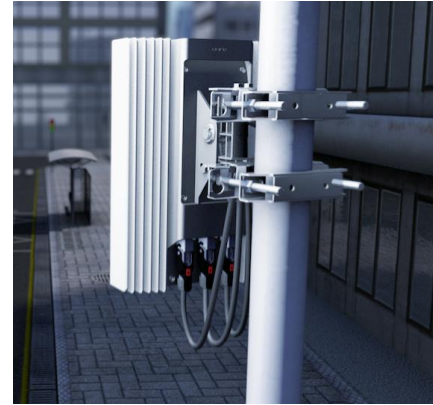
Why researching the Realverse in Nokia?

Connecting People



“Telephone calls” will probably be the/one application for XR

We create technology that helps the world act together



Designing the Realverse helps us understand XR communication requirements

Easy or Impossible?

- High-quality Virtual Reality is “solved”
 - Good and “cheap” VR Headsets
 - Immersive video technology is 4K video
 - High sense of immersion, “wow effect”
- But perfect XR is science-fiction
 - Physical limitations: energy, optics, space, force feedback, real-time realism
 - Is there an application?



Problems in eXtended Reality

- WOW effect → can we think of thousands of interesting applications?
- Cutting-edge technology → learning curve and complex mechanisms



Is it **useful**
beyond
WoW
effect?



Only for
niche use
cases?



One-size-
fits-all
approach?

Only for
geeks and
pros?

Let's try a new strategy: Inclusion by design



Towards an Incluverse

For people with intellectual disability



Our Users: Fundación Juan XXIII

- Occupational training center for opportunities and labor integration

Benefits:

- Specific needs of our users can benefit from the use of immersive technology
- VR has proven to be effective in therapeutic settings
- Adaptation to users is required (minimize cognitive load) in usage and evaluation
- Easy to port to the general population

Our projects:



Music for wellbeing



Therapy for mobility



Remote support for autonomy

Training for employment



Therapy for mobility



How it started?

- We knew that XR can be effective in therapy → Try to **solve a real problem...**
- Talk to professionals of the occupational training center of the Fundación Juan XXIII:
 - One of the **most common and limiting fears** among users is **going up and down stairs** (bathmofobia)
 - This fear limits the mobility and **independence** of these individuals → It significantly affects their quality of life, reducing their ability to participate in daily activities
 - **Systematic desensitization** is the classic technique to treat phobias → This technique often requires to imagine relaxing and anxious stimuli
 - People with ID may have **difficulties with imagination**, which can limit the effectiveness of the technique → **XR can help to overcome those limitations!**



Therapy for mobility



Proposal

- To apply the classic technique of systematic desensitization combined with **XR** and the use of **biosensors**



Meta Quest 2 +
stereo camera



Empatica E4
Wristband



EMG sensors
for muscular activity

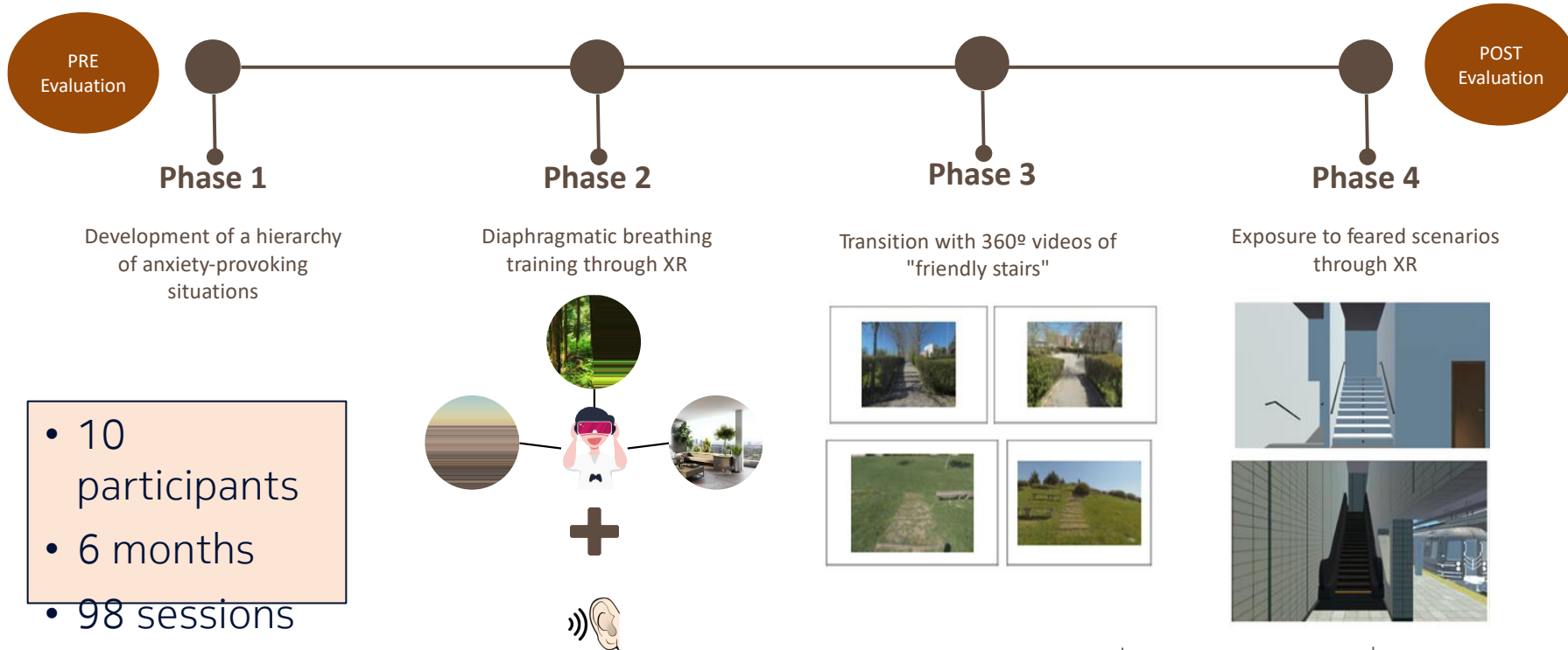


- **Other benefits** (apart from realism)
 - Safe and controlled environment
 - User monitoring
 - Gradual and personalized exposure
 - Interaction and active learning

Therapy for mobility



How we did it?

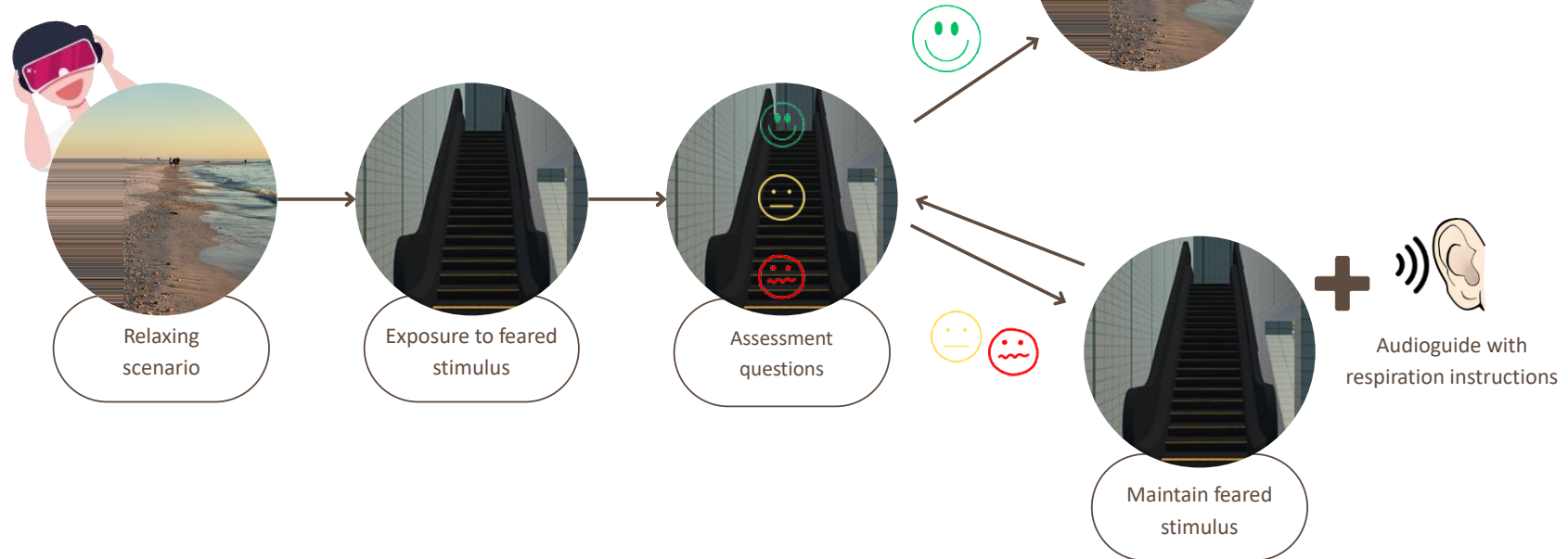


Therapy for mobility



How we did it?

- Diagram of a Phase 4 session

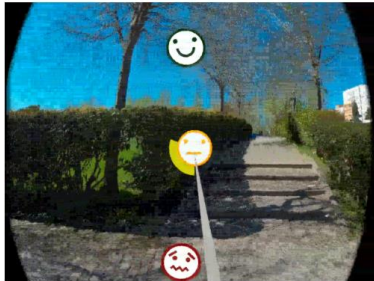


Therapy for mobility

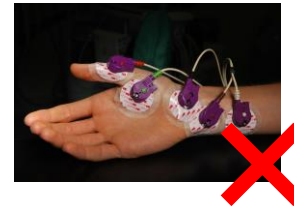


How we did it?

- Some difficulties arouse:
 - Adaptation of standard **questionnaires**
 - Simple terminology
 - Reduced scale (3 levels)
 - Visual support
- **Controllers** are difficult to use (and not natural)
 - Voting in XR with head movements



- Non-invasive and friendly **sensors**



Therapy for mobility



What we achieved?

- After the intervention, all participants were able to **face the feared stimulus** in real life.
- Both they and their families reported being **very satisfied** with the experience.
 - This process not only improved their **quality of life** but also facilitated their **inclusion** in the community.
- The use of the HMD proved to be a **motivating** element for the participants.
- This study highlights the potential of XR technologies, proposing a non-invasive, adaptable, and accessible approach for people with ID



Observed benefits

- Go beyond “typical” activities
- Alternative form of occupational training based on aspects significant to participants
- Participants feel capable of engaging with technology
- Self-esteem and sense of recognition
- Placing technology at the service of people
- Iterative design process to adapt technology to the actual needs of users



Benefits come mostly from the interaction between the technology (and the researchers!) and the users

The ~~Metaverse~~ will be...

INCLUVERSE



...for the inclusion
of people in
psychosocial
vulnerability
situations...

...or it will
not be at all

NOKIA



UNIVERSIDAD
POLITÉCNICA
DE MADRID

fundación
JuanXXIII

Thank you

Demos during the networking



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MINISTERIO
PARA LA TRANSFORMACIÓN DIGITAL
Y DE LA FUNCIÓN PÚBLICA



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